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Clearing the air on smog

WHAT IS SMOG?

The term smog comes from the words “smoke” and “fog”, and refers to the brownish-yellow haze we can sometimes see blanketing the horizon in warmer months.

Although smog contains a mixture of contaminants, the most serious components are ground-level ozone and inhalable and respiratory particulates. We’ve all heard of ozone in the upper atmosphere, where it actually protects the earth from the sun’s harmful ultraviolet rays. However, at ground level, where humans live and breathe, ozone is toxic and irritates mucous membranes.

Particulates are another key component of smog. Inhalable particulates measure less than 10 micrometres (microns) in diameter. They are easily inhaled, and the smaller size particles - those less than 2.5 microns - can travel to the deepest part of the respiratory tract. The 2.5 micron fraction is commonly referred to as “respirable particulates.”



Where does smog come from?

Ground-level ozone is formed when two primary pollutants, nitrogen oxides (NOx) and volatile organic compounds (VOCs), react in the presence of sunlight.

Cars, trucks, power plants and manufacturing industries burn fossil fuels to produce NOx. In Ontario, motor vehicles are the largest single source of NOx emissions.

Although VOCs occur naturally in the atmosphere, some result from human activity. Most VOCs are released into the air from the evaporation of gasoline, oil-based paints and cleaning solvents. VOCs also come from transportation activities like automobile exhaust, or even from dry cleaning. In urban areas across Canada, automobiles are the most significant source of VOCs.

Inhalable particulates come from many sources including wind-blown dust from roads, construction sites, and agricultural areas, ash from forest fires and emissions from industries. Respirable particulates are emitted directly into the air by diesel and gasoline engines, fuel combustion, power plants, and a range of industries. These particles can also be formed in the air by the chemical reaction of pollutants such as sulphates from sulphur dioxide.



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Effects on health

Smog can be irritating to the eyes, nose and throat after only a few hours of exposure. Some people may start to cough or have difficulty breathing. Although these outward symptoms usually disappear, if repeated exposure occurs, lungs suffer premature aging.

When air quality is poor, anyone may feel the effects of exposure to ozone and particulates. However, some groups of people are especially sensitive. Children, the elderly, and people with asthma or other respiratory conditions are more susceptible to the effects of smog, as are people who work or exercise outdoors.



Effects on vegetation

Humans are not the only organisms to suffer from the ill-effects of ozone. Ozone can seriously damage our crops and forests as well. It acts by attacking the foliage of plants, reducing growth and crop yield.



CONTRIBUTING FACTORS TO SMOG

Weather and geographical conditions

In most cases, sunlight and heat are the two main weather conditions contributing to ground-level ozone formation. However, rain and wind can also affect ground-level ozone and particulate levels. Smog usually reaches high levels when winds are low, temperatures are high and there is no cloud cover. These weather conditions are associated with slow-moving weather patterns that allow air pollutants to build up. Rain showers can wash the air of pollutants that cause smog. However, this may result in acid rain.

Transboundary air pollution

Wind also carries air pollution over great distances, sometimes from as far away as the mid-western United States. Smog often moves from urban centres like Toronto to rural communities close-by.

Smog can be imported over the Canada/U.S. border. This is called transboundary air pollution. Smog concentrations are particularly pronounced along the U.S. border and near the shores of the Great Lakes. In fact, more than half of the ground-level ozone over Ontario originates from transboundary emissions.

WORKING TOGETHER TO REDUCE SMOG

The Canadian Council of Ministers of the Environment (CCME)

The Canadian Council of Ministers of the Environment (CCME) is the major intergovernmental forum in Canada for discussion and action on environmental issues of national and global concern.

CCME is made up of environment ministers from each of the ten provinces, the two territories and the federal government. Its work is aimed at developing a consistent and coordinated approach among governments to solve environmental problems.





The CCME NO_x/VOCs Management Plan

Recognizing the seriousness of the smog problem in Canada, CCME developed a plan for the management of NO_x and VOCs in 1990, with reduction targets of 25% for Ontario NO_x and VOC emissions from 1985 levels.

As a follow up to the 1990 plan, a national smog strategy is currently being developed. Ontario is committed to have an Ontario smog management plan which will be incorporated into a national smog strategy to be tabled with CCME in 1997.

Across Ontario

The Southern Ontario Corridor is Canada's worst area for smog. Acceptable levels for ozone are exceeded here more often, for longer periods of time and at higher concentrations than anywhere else in the country. The Ontario portion of the Southern Ontario Corridor encompasses everything south of the line between Grand Bend on Lake Huron and Arnprior on the Ottawa River. The region from Windsor to Toronto experiences particularly high ozone levels, partly because of air pollution from neighbouring U.S. sources.

Ontario has a number of initiatives as part of its approach to smog reduction, including:

- ◆ By 2005, new passenger vehicle tailpipe emission standards, in place this year, are expected to reduce nitrogen oxide by 21 kilotonnes a year and volatile organic compound emissions by 6 kilotonnes a year.
- ◆ By the year 2000, Ontario Hydro has committed to reduce annual nitrogen oxide emissions by at least 37 kilotonnes, or 40 per cent of the 1985 level. Ontario Hydro has actually achieved this reduction target in 1993-1995.
- ◆ By 1998, Ontario's vapour recovery regulation for gasoline distribution systems is expected to reduce annual volatile organic compound emissions by 19 kilotonnes.
- ◆ Restrictions on the volatility of gasoline during summer months have reduced annual volatile organic compound emissions by 12 kilotonnes since 1989.
- ◆ In 1991, INCO Limited in Sudbury reduced nitrogen oxide emissions by 43 kilotonnes a year from the 1990 level.
- ◆ In 1994, the Countdown Acid Rain Program reduced sulphur dioxide emissions by 570 kilotonnes a year from the 1990 level. Part of this reduction was achieved through the use of new, cost-effective Canadian smelting technology developed by INCO and Falconbridge Limited of Sudbury. The combined Canadian and U.S. reductions will have reduced the secondary formation of inhalable and respirable particulate as sulphates.
- ◆ Transit, building code and taxation initiatives to reduce energy consumption are expected to reduce nitrogen oxides emissions by six kilotonnes a year.
- ◆ Voluntary pollution prevention Memoranda of Understanding with the Automotive Parts Manufacturers Association, the Canadian Chemical Producers Association, the Motor Vehicle Manufacturers Association, the Ontario Printing and Imaging Association and the metal finishing industry.



WHAT YOU CAN DO TO REDUCE SMOG

Become travel smart

Walk, cycle, use public transportation or carpool whenever possible. One busload of passengers removes 40 vehicles from the road, saves 83,000 litres of fuel and avoids 11.5 tonnes of air pollutants a year.

Share rides. Two people in a vehicle cuts the fuel consumption per person in half.

Drive at moderate speeds. Optimum fuel economy for most vehicles is between 50 and 70 km/hr. Reducing speed from 100 to 80 km/hr reduces fuel consumption by 15 to 20 per cent.

Roll up your windows on the highway to avoid increased fuel consumption and wind resistance. Open vents instead for a breath of fresh air.

Keep your car well tuned by following the maintenance recommendations in your owner's manual. A poorly tuned engine can suck up to 10 per cent more fuel.

Check your tires regularly. Tire drag due to under-inflation increases fuel consumption by 4 to 8 per cent.

Turn off the car engine when staying in the same spot for more than a minute. Excessive idling pollutes and wastes fuel.



Around the home

When renovating, think green. Energy-efficient windows, solar hot water systems and better weatherstripping and caulking will help you save energy, money and will help the environment.

Cool your home in summer with fans, an environmentally sound alternative to air conditioners. Using awnings and blinds helps reduce heat gain through windows. Trees planted on the south side of the house can also provide shade from the hot summer sun.

Switch to fluorescent or energy-saving incandescent light bulbs. This lighting helps reduce emissions that contribute to smog - particularly if electricity comes from coal or oil-burning stations.

Use an electric mower or, even better, a push mower instead of a gasoline-powered machine. Choose hand tools over power tools wherever reasonably possible for gardening and odd jobs.

Everyday items like oil-based paints, household cleaners and personal care products may contain VOC-emitting solvents. If you must use solvents, follow directions, use only what you need and dispose of them with care. Leftover paint should be taken to a household hazardous waste depot or given to someone who can use it. Some communities have paint recycling depots which take leftover paint, recycle it and put it back on the shelf.



Shop wisely

Reducing energy and making wise buying decisions both contribute to cleaner air. The following tips should help you make smog-smart buying decisions when shopping:



When purchasing a home, choose an energy-efficient model like the R-2000 home.

Alternative fuels – propane and natural gas – are a good choice if available in your area. Ask your local gas utility or auto propane dealer for more information.

If you're buying a new car, a fuel-efficient model will reduce emissions by consuming less gas. Transport Canada and Natural Resources Canada publish a Fuel Consumption Guide every year which can be picked up at any provincial/territorial motor vehicle licence agency.

When choosing appliances, the most energy-efficient models can be selected with the help of the EnerGuide label — the lower the rating, the less energy that appliance uses. Choose fixtures that use less water in the kitchen, laundry and bathroom.

Alternatives to solvent-rich products, such as water-based paints, have been available for some time and should be used instead. With the help of the EcoLogo, consumers can now choose paints and other products that are considered to have less environmental impact.

**FOR MORE INFORMATION ON
SPECIFIC ONTARIO CLEARING THE AIR INITIATIVES,
PLEASE CONTACT:**



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Content is adapted from original material prepared by the NO_x/VOC Office of the CCME.

